

CLAIMS

I claim:

- 5 1. A method for detecting and analyzing errors in a generic function call comprising:
 - providing a generic function call;
 - providing a relation that includes sets of dummy arguments associated with the generic function call;
- 10 first sorting through the relation to determine whether the generic function call contains errors;
 - if the first sorting determines that the generic function call includes an error, second sorting through the relation to determine a failure mode for the generic function call;
- 15 and
 - providing an error message that includes identifies the that the generic function call has an error and provides information about the failure mode of the generic function call as determined by the second sorting.
- 20 2. The method of Claim 1 wherein the relation comprises a generic function definition table.
3. The method of Claim 1 wherein the relation comprises a matrix of argument signatures that relate the sets of dummy arguments with associated specific functions
- 25 for the generic function.
4. The method of Claim 3 wherein the first sorting through the relation comprises sorting and comparing each dummy argument of an argument signature with the generic function call until a parameter mismatch is determined for the dummy argument at which time the first sorting skips to a next argument signature and continues sorting and comparing the generic function call with the dummy arguments

of the next argument signature until all of the dummy arguments of the relation are sorted and compared with the generic function call.

5. The method of Claim 3 wherein the second sorting through the relation to determine the failure mode of the generic function call comprises:
 - identifying which parameters of the generic function call contain errors; and
 - wherein providing an error message comprises providing an error message that identifies which parameters contain errors in the generic function call.
- 10 6. The method of Claim 5 wherein said second sorting further comprises clarifying the nature of the error to determine a type of error present in the parameter that contains errors; and
 - wherein providing an error message comprises providing an error message that identifies which parameter contains the error and the type of error.
- 15 7. The method of Claim 6 wherein clarifying the nature of the error to determine a type of error present in the parameter includes determining that the type of error is at least one of a rank error, a type error, and a kind error.
- 20 8. The method of Claim 3 wherein the second sorting determines which argument signature has the most correct format matches with the generic function call;
 - and wherein a mis-matched parameter in the argument signature having the most correct format matches is identified as a parameter containing an error.
- 25 9. A method for detecting and analyzing errors in a generic function call constructed in accordance with a programming language protocol, the method comprising:
 - providing a generic function call that can invoke a plurality of different specific functions which can be varied by selecting different parameters of the generic function call;
 - determining whether the generic function call contains errors;

identifying the nature of the errors in the generic function call;
and
providing an error message that includes information about the failure mode
that caused the errors in the generic function call.

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10. The method of Claim 9 wherein determining whether the generic function call
contains errors comprises:

providing a relation that defines the generic function call in terms of sets of
dummy arguments comprising argument signatures representative of specific
functions defined for the generic function call;

10 first sorting through the relation to compare the generic function call with the
dummy arguments of the relation;

15 where the generic function call correctly matches a format for one of
the arguments signatures of the relation, the generic function call is deemed to
have no error;

where the generic function call does not correctly match a format for
any of the arguments signatures, the generic function call is deemed to have an
error;

wherein identifying the nature of the errors comprises:

20 recognizing that the first sorting has determined that an error is present
in the generic function call;

second sorting through the relation to determine if the failure mode in
the generic function call can be further clarified;

and

25 wherein providing an error message comprises providing an error message that
includes information about the failure mode determined by the second sorting.

11. The method of Claim 10 wherein the relation comprises a generic function
definition table.

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12. The method of Claim 10 wherein the relation comprises a matrix of argument signatures that relate dummy arguments with associated specific functions for the generic function.

5 13. The method of Claim 10 wherein the first sorting through the relation comprises sorting and comparing each dummy argument of an argument signature with the generic function call until a parameter mismatch is determined for the dummy argument at which time the first sorting skips to a next argument signature and continues sorting and comparing the generic function call with the dummy 10 arguments of the next argument signature until all of the dummy arguments of the relation are sorted and compared with the generic function call.

14. The method of Claim 10 wherein the second sorting through the relation to determine the failure mode of the generic function call comprises:

15 identifying which parameters of the generic function call contain errors; and
wherein providing an error message comprises providing an error message that identifies which parameters contain errors in the generic function call.

20 15. The method of Claim 14 wherein said second sorting further comprises clarifying the nature of the error to determine a type of error present in the parameter that contains errors; and
wherein providing an error message comprises providing an error message that identifies which parameter contains the error and the type of error.

25 16. The method of Claim 15 wherein clarifying the nature of the error to determine a type of error present in the parameter includes determining that the type of error is at least one of a rank error, a type error, and a kind error.

30 17. The method of Claim 10 wherein the second sorting determines which argument signature has the most correct format matches with the generic function call;

and wherein a mis-matched parameter in the argument signature having the most correct format matches is identified as a parameter containing an error.

18. A computer readable media including computer program code for detecting
5 and analyzing errors in a generic function call, computer readable media comprising:
computer code for providing a generic function call that can invoke a plurality
of different specific functions which can be varied by selecting different parameters of
the generic function call;
computer code for determining whether the generic function call contains an
10 error;
computer code for identifying the nature of the error; and
computer code for providing an error message that includes information about
the failure mode that caused the error in the generic function call.
- 15 19. The computer readable media of Claim 18 wherein the code for determining
whether the generic function call contains errors comprises:
computer code for providing a relation that defines the generic function call in
terms of sets of dummy arguments configured as arguments signatures representative
of specific functions defined for the generic function call;
20 computer code for first sorting through the relation to compare the generic
function call with the dummy arguments of the relation;
where the generic function call correctly matches a format for one of
the argument signatures, the generic function call is deemed to have no error;
where the generic function call fails to correctly match a format for any
25 of the argument signatures, the generic function call is deemed to have an
error;
wherein the computer code for identifying the nature of the errors comprises:
computer code for recognizing that the first sorting has determined that
an error is present in the generic function call;
30 computer code for second sorting through the relation to determine if
the failure mode in the generic function call can be further clarified;
and

wherein the computer code for providing an error message includes code for providing an error message that includes information about the failure mode determined by the second sorting.

- 5 20. The computer readable media of Claim 19 wherein the relation comprises a computer readable generic function definition table for the generic function call.
- 10 21. The computer readable media of Claim 19 wherein the relation comprises a computer readable matrix of arguments signatures that relate sets of dummy arguments with associated specific functions for the generic function call.
- 15 22. The computer readable media of Claim 19 wherein the computer code for first sorting through the relation comprises computer code for sorting and comparing the generic function call with the dummy arguments of each argument signature until a parameter mismatch is determined for a dummy argument of the signature at which time the computer code for first sorting skips to a next argument signature and continues sorting and comparing the generic function call with the next arguments signature until all of the argument signatures defined for the generic function call are sorted and compared with the generic function call.
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23. The computer readable media of Claim 19 wherein the computer code for second sorting through the relation to determine the failure mode of the generic function call comprises computer code for identifying which parameters of the generic function call contain errors; and
- 25 wherein the computer code for providing an error message comprises computer code for providing an error message that identifies which parameters contain errors in the generic function call.
- 30 24. The computer readable media of Claim 23 wherein said computer code for second sorting further comprises computer code for clarifying the nature of the error to determine a type of error present in the parameter that contains errors; and

wherein computer code for providing an error message comprises computer code for providing an error message that identifies which parameter contains the error and the type of error.

- 5 25. The computer readable media of Claim 24 wherein the computer code for clarifying the nature of the error to determine a type of error present in the parameter includes computer code for determining that the type of error is at least one of a rank error, a type error, and a kind error.
- 10 26. The computer readable media of Claim 19 wherein the computer code for second sorting includes computer code for determining which argument signature has the most correct format matches with the generic function call;
 wherein the computer readable media includes computer code for identifying the argument signature having the fewest mis-matched parameters when compared
15 with the generic function call;
 wherein computer readable media includes computer readable code for identifying which parameters are mis-matched and identifying those mis-matched parameters as the parameters containing errors; and
 wherein the computer code for providing an error message comprises
20 computer code for providing an error message that identifies the mis-matched parameter as a parameter that contains an error.